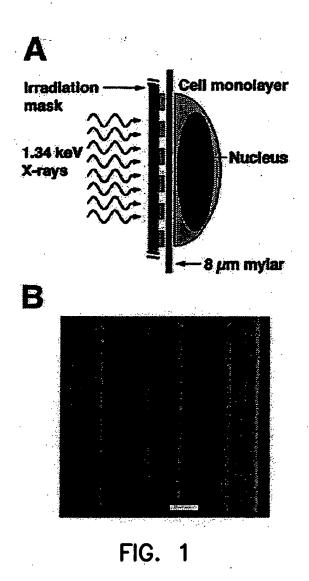
## TITLE: HODS TO ALTER LEVELS OF A DNA REPORTED PROTEIN INVENTORS NAME: John H.J. Petrini et al. SERIAL NO.: 09/837,138



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#### TITLE: JOHN TO ALTER LEVELS OF A DNA RELIZE PROTEIN INVENTORS NAME: John H.J. Petrini et al. SERIAL NO.: 09/837,138

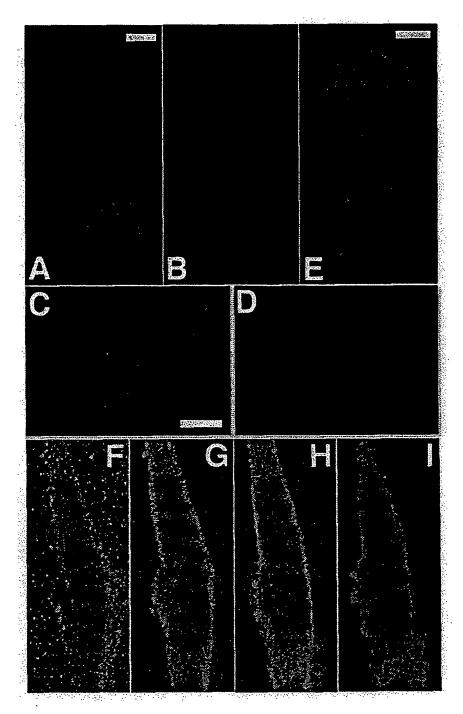
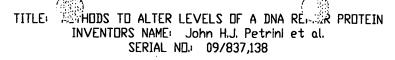


FIG. 2



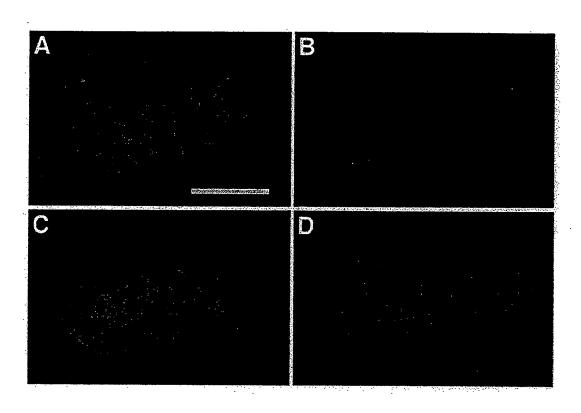


FIG. 3

TITLE: THODS TO ALTER LEVELS OF A DNA REAR PROTEIN INVENTORS NAME: John H.J. Petrini et al. SERIAL NO.: 09/837,138

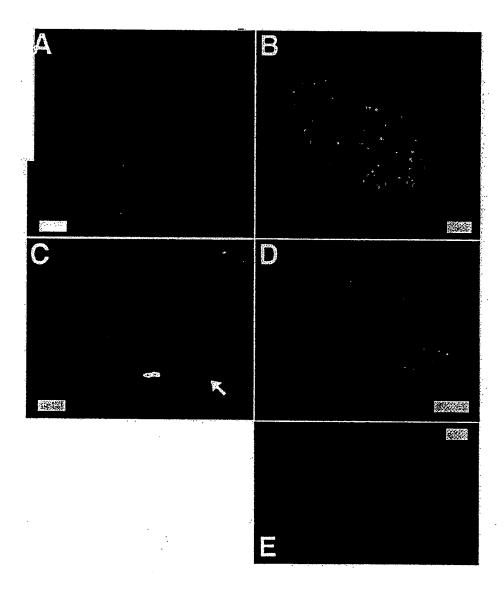
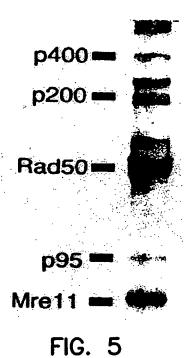
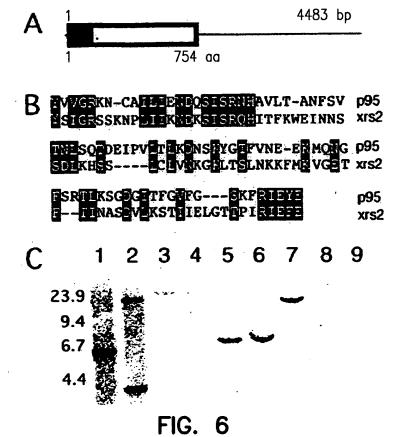


FIG. 4

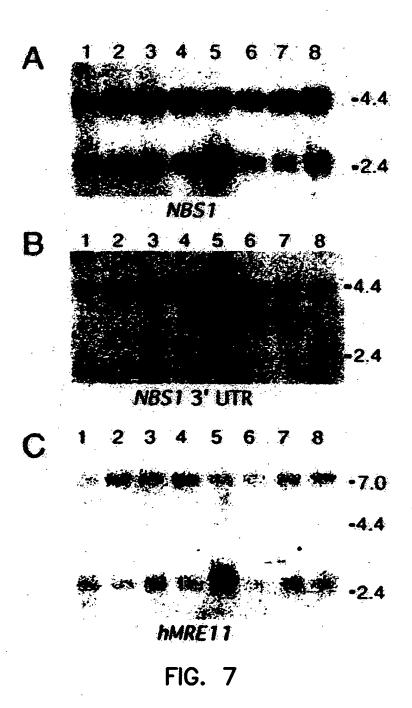
田田田田



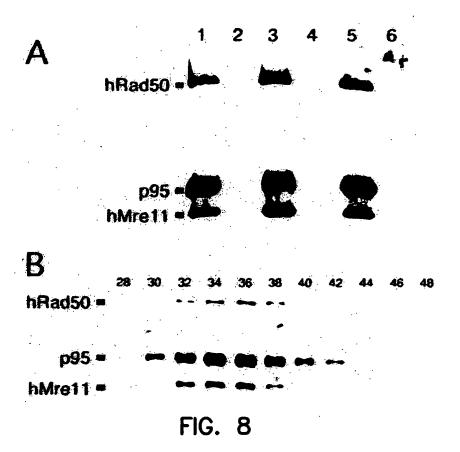


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# TITLE: HDDS TO ALTER LEVELS OF A DNA RELAR PROTEIN INVENTORS NAME: John H.J. Petrini et al. SERIAL NO.: 09/837,138



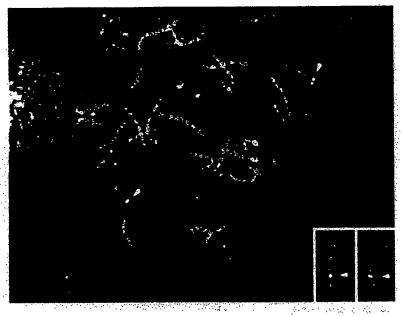
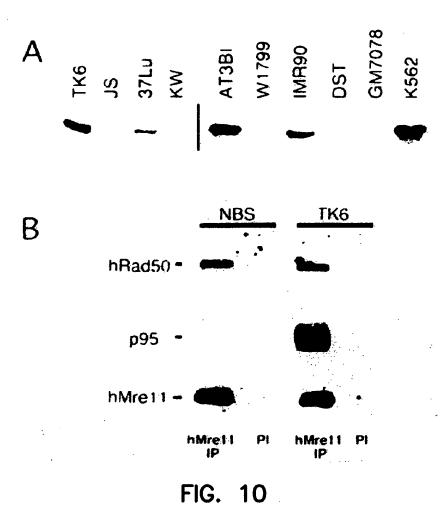


FIG. 9

#### TITLE: THODS TO ALTER LEVELS OF A DNA REAR PROTEIN INVENTORS NAME: John H.J. Petrini et al. SERIAL NO.: 09/837,138



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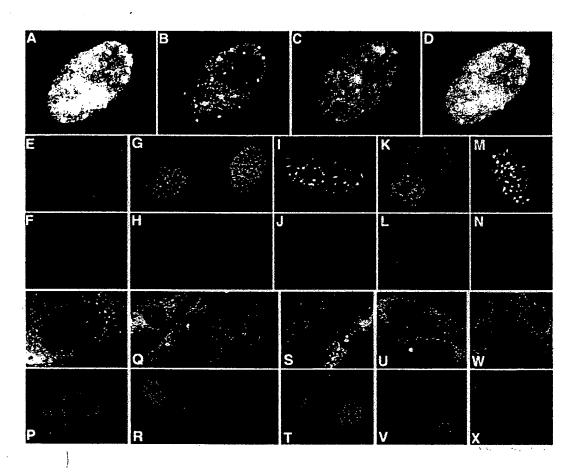


FIG. 11

### TITLE: HODS TO ALTER LEVELS OF A DNA REFOR PROTEIN INVENTORS NAME: John H.J. Petrini et al. SERIAL NO.: 09/837,138

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| Amino Acid | Codon                        |
|------------|------------------------------|
| Phe        | UUU, UUC                     |
| Ser        | UCU, UCC, UCA, UCG, AGU, AGC |
| Tyr        | UAU, UAC                     |
| Cys        | UGU, UGC                     |
| Leu        | UUA, UUG, CUU, CUC, CUA, CUG |
| Trp        | UGG                          |
| Pro        | CCU, CCC, CCA, CCG           |
| His        | CAU, CAC                     |
| Arg        | CGU, CGC, CGA, CGG, AGA, AGG |
| Gln        | CAA, CAG                     |
| Ile        | AUU, AUC, AUA                |
| Thr        | ACU, ACC, ACA, ACG           |
| Asn        | AAU, AAC                     |
| Lys        | AAA, AAG                     |
| Met        | AUG                          |
| Val        | GUU, GUC, GUA, GUG           |
| Ala        | GCU, GCC, GCA, GCG           |
| Asp        | GAU, GAC                     |
| Gly        | GGU, GGC, GGA, GGG           |
| Glu        | GAA, GAG                     |
|            |                              |

FIG. 12

## TITLE: NETHODS TO ALTER LEVELS OF A DNA REmail PROTEIN INVENTORS NAME: John H.J. Petrini et al. SERIAL NO.: 09/837,138



| Original<br>Residue | Exemplary Substitutions             | Preferred<br>Substitutions |
|---------------------|-------------------------------------|----------------------------|
| Ala (A)             | val; leu; ile                       | val                        |
| Arg (R)             | lys; gln; asn                       | lys                        |
| Asn (N)             | gln; his; lys; arg                  | g <b>ln</b>                |
| Asp (D)             | glu                                 | glu                        |
| Cys (C)             | ser                                 | ser                        |
| Gln (Q)             | asn                                 | asn                        |
| Glu (E)             | asp                                 | asp                        |
| Gly (G)             | pro                                 | pro                        |
| His (H)             | asn; gln; lys; arg                  | arg                        |
| Ile (I)             | leu; val; met; ala; phe norleucine  | leu                        |
| Leu (L)             | norleucine; ile; val; met; ala; phe | ile                        |
| Lys (K)             | arg; gln; asn                       | arg                        |
| Met (M)             | leu; phe; ile                       | leu                        |
| Phe (F)             | leu; val; ile; ala                  | leu                        |
| Pro (P)             | gly                                 | gly                        |
| Ser (S)             | thr                                 | thr                        |
| Thr (T)             | ser                                 | ser                        |
| Trp (W)             | tyr                                 | tyr                        |
| Tyr (Y)             | trp; phe; thr; ser                  | phe                        |
| Val (V)             | ile; leu; met; phe; ala; norleucine | leu                        |

FIG. 13

#### TITLE: HODS TO ALTER LEVELS OF A DNA REFOR PROTEIN INVENTORS NAME: John H.J. Petrini et al. SERIAL NO: 09/837,138

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ttcggcacgaggcgcggttgcacgtcggccccagccctgaggagccggaccgatgtggaaactgctgccgccgcggggcc ccctgtattgacattaaaagataattctaagtatggtacctttgttaatgaggaaaaaatgcagaatggcttttcccgaa  $\verb"ctttgaagtcgggggatggtattacttttggaagtgtttggaagtaaattcagaatagagtatgagcctttggttgcatgc$ tettettgtttagatgtetetgggaaaactgetttaaatcaagetatattgcaacttggaggatttactgtaaacaattg gacagaagaatgcactcaccttgtcatggtatcagtgaaagttaccattaaaacaatatgtgcactcatttgtggacgtc caattgtaaagccagaatattttactgaattcctgaaagcagttcagtccaagaagcagcctccacaaattgaaagtttt agggaaaacatttatatttttgaatgccaaacagcataagaaattgagttccgcagttgtctttggaggtggggaagcta ggttgataacagaagagaatgaagaagaacataatttetttttggctccgggaacgtgtgttgttgatacaggaataaca aactcacagaccttaattcctgactgtcagaagaaatggattcagtcaataatggatatgctccaaaggcaaggtcttag acctattcctgaagcagaaattggattggcggtgattttcatgactacaaagaattactgtgatcctcagggccatcccagtacaggattaaagacaacaactccaggaccaagcctttcacaaggcgtgtcagttgatgaaaaactaatgccaagcgcc aatcaaagtctccaaaatggaacaaaaattcagaatgctttcacaagacgcacccactgtaaaggagtcctgcaaaacaa

gctctaataataatagtatggtatcaaatactttggctaagatgagaatcccaaactatcagctttcaccaactaaattg ccaagtataaataaaagtaaagatagggcttotcagcagcagcagaccaactccatcagaaactactttcagccgtctac caaaaaaagggaaagggatgaagaaaatcaagaaatgtcttcatgcaaatcagcaagaatagaaacgtcttgttctcttt aactcagacaataacttatttacagatacagatttaaaatctattgtgaaaaattctgccagtaaatctcatgctgcaga aaagctaagatcaaataaaaaaagggaaatggatgatgtggccatagaagatgaagtattggaacagttattcaaggaca atagaaacaaatgacactttcagtgatgaagcagtaccagaaagtagcaaaatatctcaagaaaatgaaattgggaagaa acgtgaactcaaggaagactcactatggtcagctaaagaaatatctaacaatgacaaacttcaggatgatagtgagatgc ttccaaaaaagctgttattgactgaatttagatcactggtgattaaaaactctacttccagaaatccgtctggcataaat gatgattatggtcaactaaaaaatttcaagaaattcaaaaaggtcacatatcctggagcaggaaaacttccacacatcat tggaggátcagatctaatagctcatcatgctcgaaagaatacagaactagaagagtggctaaggcaggaaatggaggtac aaaatcaacatgcaaaagaagagtctcttgctgatgatctttttagatacaatccttatttaaaaaggagaagataactg aggattttaaaaagaagccatggaaaaacttcctagtaagcatctacttcaggccaacaaggttatatgaatatatagtg taacaattgtttgtyctgttttcaggctttgtcattgcatcttttttttcatttttaaatgtgttttgtttattaaatagt taatatagtcacagttcaaaattctaaatrtacgtaaggtaaaggactaaagtcacccttccaccattgtcctagctact tggttcccctcagaaaaaattcatggatactcatttcttatgratctttccagggatttttgagtcctattcaaattcc tatttttaaataatttcctacacaaatgatagcataacatatgcagtgttctacaccttgcttttttacttagtaagatt aaaaattataggaatatcaatataatgtttttaatattttttcttttccattatgctgtagtcttacctaaactctggtg atccaaacaaaatggcttcagtggtgcagatgtcacctacatgttattctagtactagaaactgaagaccatgtggagac aaagggagatggtaagaaacaatgaatgtcttttttcaaactttattgacaagtgattttcaaagtctgtgttcaaaaata tattcatgtacctgtgatccagcaagaagggagttccagtcaagagtcactacaactgattagttgtttagagaatgaga aatggaacagtgaggaatggaggccatatttccatgacttcccttgtaaacagaagcaacagaagggacaagaggctggc gctgcttgcaggtggaactccagctgcaagggagttagggaaatgaaggtctttttttaaaaagcttctcagccttcctag ggaacagaaattgggtgagccaatctgcaatttctactacaggcattgagaccagttagattattgaaatattatagaga gttatgaacacttaaattatgatagtggtatgacattggatagaacatgggatactttagaagtagaattgacagggcat attagttgatgaaatggagtcatttgagtctyttaatagccatgtatcataattaccaagtgaagctggtggaacatatg gtctccattttacagttaaggaatataatggacagattaatattgttytctgtcatgcccacaatccctttctaaggaag aaatattgggtgttgtccagtatttttccctttttaaccmttcccaattcgggtgtgtaggtggatgtttccatttgggt tttaatttgtatatccctgatagctataattgggtcatagaaattctttatacattctagatgcaagtctcttgycggat atacgtattgagatattacacctagtctgtggcttgactgttttctttatgtcttttgatgaatagaagttttaaatttt ttttttcccccatacaagtatccagtcattgtaacactgtttattgaaagaattatcctttcctcattaaattaccttgc caattagtaaaaaatcaattaaccatrmarmmmrrrggatccactagttctagagcggccgccaccgcggtggagctcca

FIG. 14

#### TITLE: HODS TO ALTER LEVELS OF A DNA REFOR PROTEIN INVENTORS NAME: John H.J. Petrini et al. SERIAL NO.: 09/837,138

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Minus a english

MWKLLPAAGPAGGEPYRLLTGVEYVVGRKNCAILIENDQSISRNHAVLTANFSVTNLSQTDEIFVLTLKDNSKYGTFVNE EKMQNGFSRTLKSGDGITFGVPGSKFRIEYEPLVACSSCLDVSGKTALNQAILQLGGFTVNNWTEECTHLVMVSVKVTIK TICALICGRPIVKPEYFTEFLKAVQSKKQPPQIESFYPPLDEPSIGSKNVDLSGRQERKQIFKGKTFIFLNAKQHKKLSS AVVFGGGEARLITEENBEEHNPFLAPGTCVVDTGITNSQTLIPDCQKKWIQSIMDMLQRQGLRPIPEAEIGLAVIFMTTK NYCDPQGHPSTGLKTTTPGPSLSQGVSVDEKLMPSAPVNTTTYVADTESEQADTWDLSERPKEIKVSKMEQKFRMLSQDA PTVKESCKTSSNNNSMVSNTLAKMRIPNYQLSPTKLPSINKSKDRASQQQQTNSIRNYFQPSTKKRERDEENQEMSSCKS ARIETSCSLLEQTQPATPSLWKNKEQHLSENEPVDTNSDNNLFTDTDLKSIVKNSASKSHAAEKLRSNKKREMDDVAIED EVLEQLFKDTKPELEIDVKVQKQEEDVNVRKRPRMDIETNDTFSDEAVPESSKISQENEIGKKRELKEDSLWSAKEISNN DKLQDDSEMLPKKLLLTEFRSLVIKNSTSRNPSGINDDYGQLKNFKKFKKVTYPGAGKLPHIIGGSDLIAHHARKNTELE EWLRQEMEVQNQHAKEESLADDLFRYNPYLKRRR.

FIG. 15